Trig-Tek™

203PC-1
Charge Amplifier
User Manual

Publication No. 980982 Rev. A

Astronics Test Systems Inc.
4 Goodyear, Irvine, CA 92618
Tel: (800) 722-2528, (949) 859-8999; Fax: (949) 859-7139

atsinfo@astronics.com atssales@astronics.com
atshelpdesk@astronics.com http://www.astronicstestsystems.com

Copyright 2011 by Astronics Test Systems Inc. Printed in the United States of America. All rights reserved.
This book or parts thereof may not be reproduced in any form without written permission of the publisher.

THANK YOU FOR PURCHASING THIS ASTRONICS TEST SYSTEMS PRODUCT

For this product, or any other Astronics Test Systems product that incorporates software drivers, you may access our web site to verify and/or download the latest driver versions. The web address for driver downloads is:

http://www.astronicstestsystems.com/support/downloads

If you have any questions about software driver downloads or our privacy policy, please contact us at:

atsinfo@astronics.com

WARRANTY STATEMENT

All Astronics Test Systems products are designed to exacting standards and manufactured in full compliance to our AS9100 Quality Management System processes.

This warranty does not apply to defects resulting from any modification(s) of any product or part without Astronics Test Systems express written consent, or misuse of any product or part. The warranty also does not apply to fuses, software, non-rechargeable batteries, damage from battery leakage, or problems arising from normal wear, such as mechanical relay life, or failure to follow instructions.

This warranty is in lieu of all other warranties, expressed or implied, including any implied warranty of merchantability or fitness for a particular use. The remedies provided herein are buyer's sole and exclusive remedies.

For the specific terms of your standard warranty, contact Customer Support. Please have the following information available to facilitate service.

1. Product serial number
2. Product model number
3. Your company and contact information

You may contact Customer Support by:

E-Mail:	atshelpdesk@astronics.com	
Telephone:	+1 800 722 3262	(USA)
Fax:	+1 949 859 7139	(USA)

RETURN OF PRODUCT

Authorization is required from Astronics Test Systems before you send us your product or sub-assembly for service or calibration. Call or contact Customer Support at 1-800-722-3262 or 1-949-859-8999 or via fax at 1-949-859-7139. We can also be reached at: atshelpdesk@astronics.com.

If the original packing material is unavailable, ship the product or sub-assembly in an ESD shielding bag and use appropriate packing materials to surround and protect the product.

PROPRIETARY NOTICE

This document and the technical data herein disclosed, are proprietary to Astronics Test Systems, and shall not, without express written permission of Astronics Test Systems, be used in whole or in part to solicit quotations from a competitive source or used for manufacture by anyone other than Astronics Test Systems. The information herein has been developed at private expense, and may only be used for operation and maintenance reference purposes or for purposes of engineering evaluation and incorporation into technical specifications and other documents which specify procurement of products from Astronics Test Systems.

TRADEMARKS AND SERVICE MARKS

All trademarks and service marks used in this document are the property of their respective owners.

- Racal Instruments, Talon Instruments, Trig-Tek, ActivATE, Adapt-A-Switch, N-GEN, and PAWS are trademarks of Astronics Test Systems in the United States.

DISCLAIMER

Buyer acknowledges and agrees that it is responsible for the operation of the goods purchased and should ensure that they are used properly and in accordance with this document and any other instructions provided by Seller. Astronics Test Systems products are not specifically designed, manufactured or intended to be used as parts, assemblies or components in planning, construction, maintenance or operation of a nuclear facility, or in life support or safety critical applications in which the failure of the Astronics Test Systems product could create a situation where personal injury or death could occur. Should Buyer purchase Astronics Test Systems product for such unintended application, Buyer shall indemnify and hold Astronics Test Systems, its officers, employees, subsidiaries, affiliates and distributors harmless against all claims arising out of a claim for personal injury or death associated with such unintended use.

FOR YOUR SAFETY

Before undertaking any troubleshooting, maintenance or exploratory procedure, read carefully the **WARNINGS** and **CAUTION** notices.

This equipment contains voltage hazardous to human life and safety, and is capable of inflicting personal injury.

If this instrument is to be powered from the AC line (mains) through an autotransformer, ensure the common connector is connected to the neutral (earth pole) of the power supply.

Before operating the unit, ensure the conductor (green wire) is connected to the ground (earth) conductor of the power outlet. Do not use a two-conductor extension cord or a three-prong/two-prong adapter. This will defeat the protective feature of the third conductor in the power cord.

CAUTION
SENSITIVE ELECTRONIC DEVICES
DO NOT SHIP OR STORE NEAR STRONG ELECTROSTATIC, ELECTROMAGNETIC, MAGNETIC OR RADIOACTIVE FIELDS

Maintenance and calibration procedures sometimes call for operation of the unit with power applied and protective covers removed. Read the procedures and heed warnings to avoid “live” circuit points.

Before operating this instrument:

1. Ensure the proper fuse is in place for the power source to operate.

2. Ensure all other devices connected to or in proximity to this instrument are properly grounded or connected to the protective third-wire earth ground.

If the instrument:

- fails to operate satisfactorily
- shows visible damage
- has been stored under unfavorable conditions
- has sustained stress

Do not operate until performance is checked by qualified personnel.

Table of Contents

Chapter 1 ..... **1-1**

Introduction **1-1**

Description 1-3
Specifications 1-4
Input 1-4
Acceleration Output 1-4
Velocity Output 1-5
Displacement Output 1-5
DC Output 1-6
Controls 1-7
Indicators 1-8
Power 1-8
Size 1-8

Chapter 2 ..... **2-1**

Operation **2-1**

MODE Switch 2-1
SENSITIVITY Switch 2-1
LEVEL Switch 2-2
FULL SCALE UNITS Switch 2-2
DC Output Switch X1-X10 2-2
HIGH PASS Switch 2-2
LOW PASS Switch 2-2
SE-ISO-DIFF and OFF-CURR-ON Switch 2-3
CAL Mode 2-3

Chapter 3 ..... **3-1**

Performance Test **3-1**

Test Equipment 3-1
Switch Settings 3-1
Front Panel 3-1
Internal 3-1
Procedure 3-2

Chapter 4 ..... **4-1**

Calibration Test **4-1**

Test Equipment 4-1
Switch Settings 4-1
Front Panel 4-1

Internal 4-2
Charge Converter Adiustment 4-2
Meter and Output Units Scaling 4-2

List of Figures

Figure 1-1, 203PC-1 Charge Amplifier 1-2
Figure 1-2, 203PC-1 Charge Amplifier, Block Diagram 1-3

Figure 4-1, Switch and Resistor Adjustment Locations 4-2

This page was left intentionally blank.

DOCUMENT CHANGE HISTORY

Revision	Date	Description of Change
A	06/07/2011	Document Control release

This page was left intentionally blank.

Chapter 1
Introduction

The 203PC-1 Charge Amplifier (**Figure 1-1**) covers the frequency range from 3 Hz to 40,000 Hz. It double-integrates the 10 mV/g acceleration output signal to provide a velocity and displacement output with a sensitivity of 100 mV per IN/SEC or MILS. The charge amplifier operates with high temperature accelerometers where pyroelectric effects may be encountered. A four-position thumbwheel sensitivity control in conjunction with a three position toggle switch accommodates pickups having sensitivities from 0.100 to 199.9 pC/g, mV/g, or mV/ips. A MODE switch selects pC/g–AA, AV or AD; mV/g–AA, AV or AD; mV/IPS–VV or VD.

The DC output switch selects X1 or X10 mV/unit for g's, IPS or MILs at the DC output. An external CAL signal can be selected by a front panel CAL switch or by the CAL Control Input (rear panel). A Low Pass Filter has 100 Hz to 19.9 kHz cutoff frequencies in 100 Hz steps, and a High Pass filter has 1 to 999 Hz cutoff frequencies in 1 Hz steps. A digital front panel meter displays selectable fullscale levels of 10, 20, 50, 100, 200, or 500 g's pk, or 1, 2, 5, 10, 20 or 50 IPS or MILS pk.

The 203PC-1 is packaged as a plug-in module. Either a single chassis or one that will accept up to six modules is available.

Features include:

- PC or mV Mode
- Digital Level Indicator
- Accel or Vel Input
- 0.100-199.9 Sensitivity
- HP and LP Filters
- Plug-in module
- Overload Detection
- AA, AV, AD or VV, VD
- Six Fullscale (FS) Ranges
- 115 or 230 V RMS Power

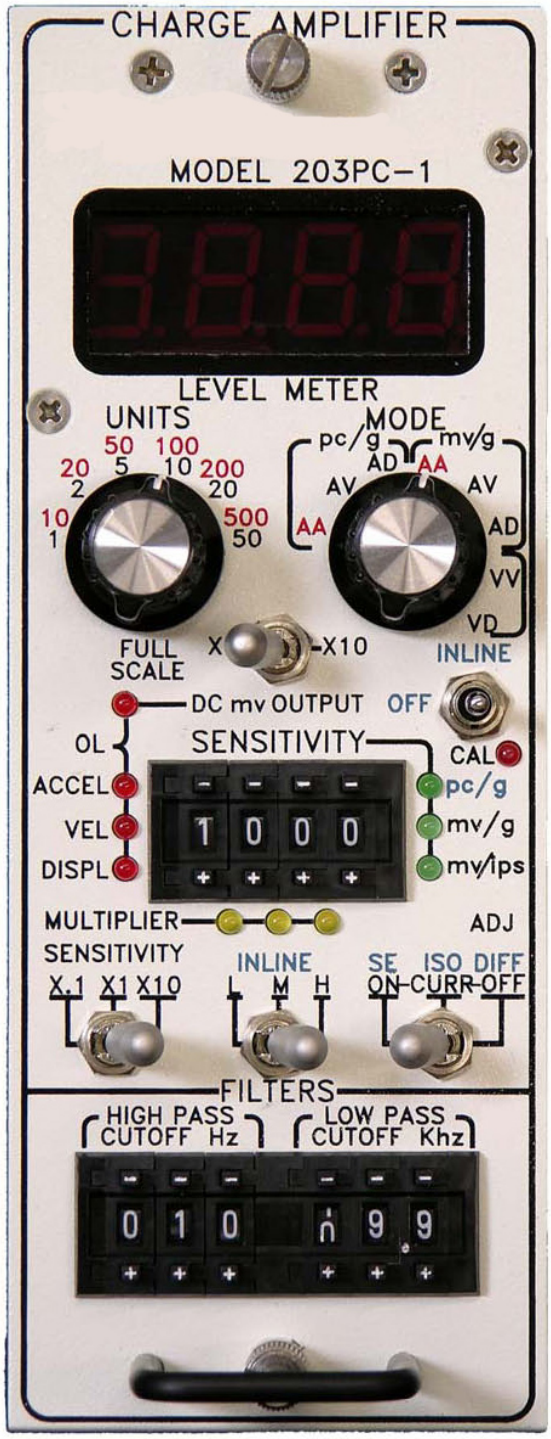


Figure 1-1, 203PC-1 Charge Amplifier

Description

The 203PC-1 double integrates the 10 mV RMS/g acceleration output signal and provides a velocity and displacement output with a sensitivity of 100 mV RMS /PEAK Inch/Sec and 100 mV RMS/Peak MILS. When MV/IPS is selected the amplifier will operate with ICP type velocity pickup with the CURR-ON, or a standard velocity pickup with the CURR-OFF. The X1-X10 DC OUTPUT switch selects either X1, or X10, multiple for the 10 mV/g, 100 MV/IPS or MILS at the DC output. An EXTERNAL CAL signal can be selected by the front panel CAL switch or by the CAL Control Input (rear panel).

An internal switch has three positions A, OUT, V to place the Low Pass Filter in the Acceleration ahead of the velocity path in “A”, OUT, or behind the velocity integrator in the “V” position. A second internal switch marked V, D or DC will place the High Pass Filter at the velocity output for “V”, at the displacement output for “D”, and in the DC path only in the “DC” position.

The unit has overload circuits to alert if fullscale peak levels are exceeded.

Figure 1-2 shows a block diagram of the circuit operation.

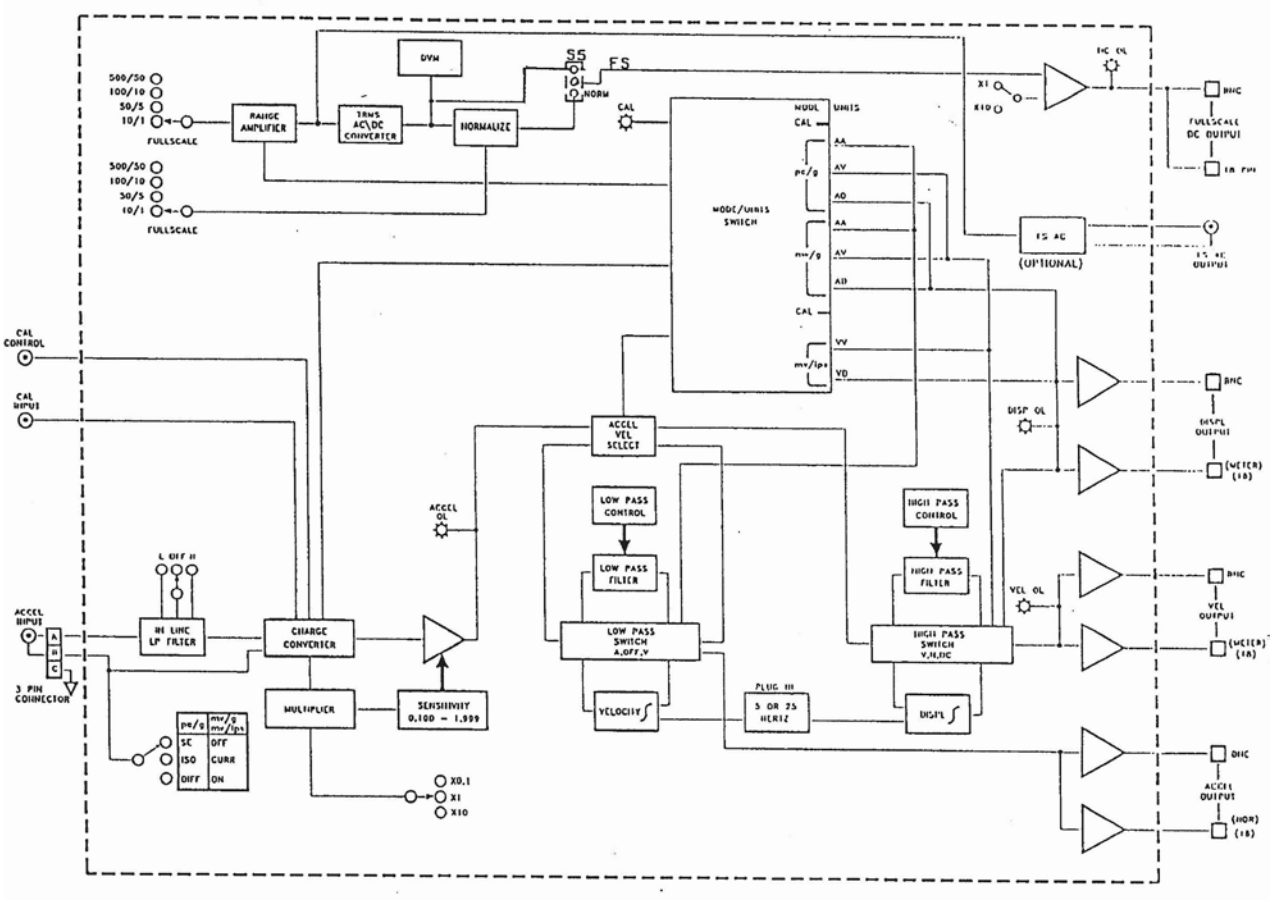


Figure 1-2, 203PC-1 Charge Amplifier, Block Diagram

Specifications

Input

Connector	BNC or 3-pin PT02A-8-33P.
Charge Sensitivity	0.100 to 199.9 pC/g, mV/g or MV/IPS with three selectable ranges, X0.1, X1, and X10.
Frequency Response	±3% from 5 Hz to 40,000 Hz referred to 100 Hz (filters OUT.)
Overload Recovery	100% overdrive of a 1 ms half sine input pulse will cause no effect at the output except clipping.
Amplitude (Stability vs. Temperature)	Less than 2% change from 30˚ to 130˚F.
Amplitude (Stability vs. Input Capacity)	Less than 0.1% change per 1,000 pF.
Shunt Resistance	Will operate with any input impedance above 200 kilohms.
Filtering-Low Pass	48 dB per octave or greater roll off with cutoffs selectable from 100 Hz to 20 kHz in 100 Hz steps.
Filtering - High Pass	48 dB/oct roll off from 5 Hz to 999 Hz in 1 Hz steps.

Acceleration Output

Voltage (max)	10 Volts RMS.
Sensitivity	10 mV RMS/Peak g.
Impedance	Less than 25 Ohms (10 mA max).
Maximum Capacity for Fullscale Output at 20 kHz	0.033 uf
Amplitude Linearity	±1% of best straight line approximation of output vs. input amplitude.
Amplitude Accuracy (Freq Response)	±2% of reading ±1% of FS in series with selected filter.

Noise	0.05 pC maximum with 1.0 pC/g sensitivity. Noise increased 0.006 g/1000 pF of additional capacity at the input.
Harmonic Distortion	Less than 1%.
DC Offset	Less than 10 mV.
Connector	(18-pin) PTO 24-14-18S and BNC.

Velocity Output

Voltage Max	10 Volts RMS.
Sensitivity	100 mV RMS/Peak Inch/sec.
Impedance	Less than 25 Ohms (10 mA max.)
Maximum Capacity for Fullscale Output at 2 Hz.	0.33 uf.
Frequency Response	±3% 25 Hz to 3,000 Hz of a -6 dB/oct slope, in series with any selected filtering. (Plug-in capability will be provided to extend low end response to 5 Hz.)
DC Offset	Less than 10 mV.
Connector	(18-pin) PTO2A-14-18S and BNC.

Displacement Output

Level	0–10 Volts RMS.
Impedance	Less than 5 Ohms.
Sensitivity	100 mV RMS/Peak MIL
Maximum Capacity for Fullscale Output at 2 kHz	0.33 uf.
Frequency Response	±3% 30 Hz to 1,000 Hz of a -12 dB slope. ±5% 25 Hz to 3,000 Hz of a-12 dB slope in series with the selected LOW PASS filter. (Plug-in resistor capability will be provided to extend low end response to 5 Hz.)
DC Offset	Less than 10 mV.
Converter	(18-pin) PTO2A-14-18S and BNC.

DC Output

Level	13 Volts DC max.
Impedance	Less than 25 Ohms (10 mA max.)
Sensitivity	10 or 100 mV/peak g; or 0.1 or 1 Volt/peak IPS or Peak MILS.
Linearity	±1% FS.
Amplitude Accuracy (Accel) (Vel) (Displ)	±2% of reading ±1% FS. ±4% of reading ±1% FS. ±5% of reading ±1% FS.
Dynamic Range (Accel) (Vel) (Displ)	70 dB below full scale. 50 dB below full scale. 40 dB below full scale.
Connectors	(18-pin) PTO2A-14-18S and (3-pin) PTO2A-8-33S.

Controls

HP Filter Switch	Three-section thumb switch selects 1 to 999 Hz cutoff frequencies: 48 dB/oct Butterworth high pass filter.
LP Filter Switch	Three-section thumb switch selects from 00.1 to 19.9 kHz cutoff frequencies 48dB/oct or greater Butterworth low pass filter in 100 Hz steps.
MODE Switch	Selects INPUT modes pC/g, mV/g, mV/IPS and the meter and DC input units AA, AV, AD, or VV, VD.
MULTIPLIER Input Range Switch	Selects X0.1, X1, or X10 multiplier for 1.00 to 19.99 pC/g, mV/g, or mV/IPS sensors.
SENSITIVITY Switch	Selects charge sensitivity from 1.00 to 19.99 for each range, selected by the multiplier switch.
FULL SCALE UNITS Switch	Selects, 10, 20, 50, 100, 200, or 500 g's (RED); and 1, 2, 5, 10, 20, or 50 for IPS; or MILS as fullscale units for the LEVEL meter.
SE-ISO-DIFF Switch (ON-CURR-OFF)	Selects either single-ended, isolated, or differential configuration at the input, when in pC/g mode and CURR ON or OFF in the mV/g or mV/IPS modes.
*DIFF BAL ADJ (A7-W18A)	Sets the Balance on the DIFF Input. (R2 on A7-W18A).
*ISO Adjustment (A7-W18A)	Adjustment to optimize the COMMON mode rejection when using the ISO Input Mode. (R1 on A7-W18A)
IN LINE FILTER–CAL Switch	Turns ON-OFF the in-line filter and CAL mode.
IN LINE FILTER-L,M,H Switch (works with IN LINE Switch On)	"L" 5 kHz cutoff "M" 10 kHz cutoff "H" 20 kHz cutoff

*Factory Adjust.

Indicators

DVM	3-1/2 digital panel meter indicating g's, or IPS peak, or MILS pk-pk.
CAL Light (red)	Illuminates when the CAL mode is selected, either local or remote.
OVERLOAD (OL) LED (4 ea. red)	Accel, Vel, Displ or DC illuminates when parameter is overloaded.
MODE LED (3 green)	Mode selected pC/g, mV/g, or mV/IPS LED illuminates.
MULTIPLIER DP LED (3 yellow)	Selected decimal point LED illuminates.

Power

	120 or 240 V RMS, 50-400 Hz, 15 watts nominal

Size

	7 inches high x 2.7 inches wide x 13 inches deep; up to six units mounted side-by-side in standard 19-inch wide rack.

Chapter 2
Operation

The 203PC-1 Charge Amplifier (**Figure 1-1**) is in a modular package with a self-contained power supply. Insert the amplifier into one of the six-rack spaces of a six-module rack or the single-module cabinet. If necessary, set switch S1 on the internal circuit board (located near the transformer) for the voltage to be used. Connect the AC line into 115 or 230 Volts RMS, 60 Hz power. The rack power is controlled by the switch on the power panel. PLACE THIS SWITCH TO ***POWER***.

CAUTION

The S1 115-230 switch must be at the proper setting.
If 230 V Power is applied when this switch is set for
115 V RMS circuitry will be damaged.

MODE Switch

The 203PC-1 has three input modes pC/g, mV/g, mV/IPS. The MODE switch selects the mode and the units. In the pC/g mode, the units to the meter and DC output are (AA), ACCEL g's peak, (AV) VEL IPS peak, or (AD) DISPL MILS Peak. The same for the mV/g mode. When the VV or VD mode is selected the meter and DC output units are (VV) IPS peak or (VD) MILS Peak. When operating in the mV/g or VV or VD modes, the excitation current can be turned ON or OFF by the CURR ON-OFF switch. When the CURR-OFF position is selected in the VV or VD mode the input impedance is set for 10 K Ohms. All channels can be placed in the CAL mode by grounding the center pin of the CAL control jack (rear panel), or independently by depressing the CAL switch on the front panel of a unit.

When in the mV/g mode, the input can be used as voltage input, by placing the CURR switch to OFF.

SENSITIVITY Switch

The sensitivity thumb switch sets 0.100 to 199.9 sensitivity in three ranges. The ranges are selected by the MULTIPLIER switch. For example, to set the 25 pC/g, place the multiplier switch for X10 and the sensitivity control for 025.0.

CAUTION

Only the 0 and 1 of the most significant digit will respond.

LEVEL Switch

The Level Meter is a 3-1/2 digit meter that monitors the input level for the units and fullscale selections.

FULL SCALE UNITS Switch

The FULL SCALE UNITS switch has six positions that work in conjunction with the UNITS switch. When the UNITS switch is in g's (RED), the FULL SCALE UNITS switch selects l0, 20, 50, 100, 200, or 500 g's as the fullscale units for the meter. When the UNITS switch is at IPS or MILS, the FULL SCALE UNITS switch selects 1, 2, 5, 10, 20, or 50 IPS or MILS as the fullscale units for the meter and DC output.

DC Output Switch X1-X10

The X1 position of the DC output switch scale the DC output for 10 mV/g PK, 100 mV/IPS peak, or 100 mV/MILS Peak. When the DC OUTPUT switch is at X10, the DC output sensitivities are all 10 times greater. The DC output has a switch S5 that permits selecting either FS units/Volt or NORM (normalized) (mV/unit). The units are set in the NORM mode at the factory.

HIGH PASS Switch

The HIGH PASS filter thumb has three sections to select fiom 1 Hz to 999 Hz -3dB frequency cutoff. The filter is an 8-section Butterworth. An internal HP Filter Selector has three settings: V (Vel), D (Displ), and DC (DC Output). It is set at the factory for "D", to filter the displacement output only.

LOW PASS Switch

The LOW PASS (LP) filter three-section thumb switch selects from 00.1 to 19.9 kHz -3dB frequency cutoffs in 100 Hz steps. The filter is an 8-section Butterworth. An internal LP Filter selector has three settings: A (Acceleration), OFF, and V (Velocity). It is set at the factory for "V" to filter velocity and displacement.

CAUTION

The thumb switch used does not provide stops. Only the 0 and 1 of the most significant digits used.

SE-ISO-DIFF and OFF-CURR-ON Switch

This switch selects single-ended input (SE), isolated (ISO) or differential (DIFF) input, when the pC/g mode is selected. The SE position establishes the signal ground at amplifier input. In the IS0 mode the amplifier has common mode rejection and in the DIFF the unit will operate with sensors that have a differential output. When either the mV/g or mV/IPS modes are selected this switch will also turn the sensor excitation current ON or OFF.

CAL Mode

When in the CAL mode, the CAL light will illuminate and the signal at the calibrate jack at rear panel will be connected to the input. The required level for the different sensitivity settings must be calculated. The CAL input sensitivity is 1 mV/pC. The CAL mode is selected either by putting the CALIB CONTROL input (rear panel) at ground potential to CAL all channels in the rack or by placing the IN LINE/CAL switch to CAL to select CAL to the single unit.

When in CAL mode the MODE switch will determine the input sensitivity. (See Input Sensitivity in the Specifications section of Chapter 1.)

This page was left intentionally blank.

Chapter 3
Performance Test

The 203PC-1 Charge Amplifier is a plug-in module with the circuitry on a single, printed circuit board. The 203PC-1 may be located into a single-unit cabinet or one that holds six units. The following procedure is for a single unit, and must be repeated for each module. In the event that a reading is out of tolerance the unit may require calibration (see Chapter 4). Annual calibration is recommended.

Test Equipment

Note: Equivalent test equipment can be substituted.

AC-DC Voltmeter	Keithley 191
Function Generator	Trig-Tek 346B Calibrator

Switch Settings

Front Panel

Place the MODE switch to mV/g, AA, the ON-CURR-OFF switch to OFF, the FULL SCALE UNITS switch to 100, the DC OUTPUT switch to X1, the LOW PASS FILTER Switch to 19.9 kHz, the HIGH PASS FILTER Switch to 010 Hz, the MULTIPLIER switch to X10, the SENSITIVITY Thumb Switch to 100.0, and the In Line Filter switch is OFF (center position).

Internal

CAUTION

The S1 115-230 VAC switch must be at the proper setting.
If 230 V Power is applied when this switch is set for
115 V RMS circuitry will be damaged.

- HIGH PASS and LOW PASS Filters (S2 and S3) should be in same position as during NORMAL operation. HP filter set to 20 Hz and LP filter set to 19.9 kHz.

- S4 (DC Output Selector NOR/FS) to NOR.
- Connect the power cord of the rack assembly into the power line and turn the POWER switch at the left of the rack to PWR.

Procedure

1. Connect a 61.4 ±0.2 Hz sinewave with a level of 707.0 ±5 millivolts RMS on the ACCEL INPUT jack.
2. Connect the AC Voltmeter to the ACCEL OUTPUT jack.
3. Observe an indication of 100. 0 ±3.0 millivolts RMS on the AC voltmeter. The front panel meter should indicate 10.0 ±0.3 g's.
4. Place the SENSITIVITY MULTIPLIER switch to X1.
5. Observe an indication of 1000.0 ±30 millivolts RMS on the AC voltmeter. The front panel meter should indicate 100.0 ±3.0 g's.
6. Connect the DC voltmeter to the DC output.
7. Observe an indication of 1000 ±20 millivolts DC on the DC voltmeter.
8. Set the generator for a level of 70.7 ±0.5 mV RMS and place the DC OUTPUT switch to X10.
9. Observe an indication of 1000 ±25 millivolts DC on the DC Voltmeter.
10. Set the generator for a level of 354 ±2 millivolts RMS (61.4 ±0.2 Hz).
11. Connect the AC voltmeter to the VEL OUTPUT jack.
12. Place the MODE switch to the mV/g-AV, the FULLSCALE switch to 50, DC Output Switch to X1.
13. Observe an indication of 5.0 ±0.15 Volts RMS on the AC voltmeter (the front panel meter should indication 50.0 ±1.5 IPS Pk).
14. Set the generator for 98.9 ±0.2 Hz.
15. Connect the AC voltmeter to the DISPL OUTPUT jack.
16. Observe an indication of 5.00 ±0.15 Volts RMS on the AC Voltmeter.
17. Place the MODE switch to mV/g-AD.
18. Observe an indication of 50.0 ±1.5 MILS Pk-Pk on the front panel meter.
19. Place the MODE switch to mV/g-AA.
20. Set the generator for 3.54 ±.02 Volts RMS level and a frequency of approximately 150 Hz at the ACCEL INPUT jack.
21. Observe an indication of 500 ±15 g's on the front panel meter.
22. Reduce the generator level to 7.07 ±.05 millivolts RMS.
23. Place the FULL SCALE UNITS switch to 10 g's.
24. Observe an indication of 1.00 ±0.12 g's on the front panel meter.

25. Connect the generator to the CALIB INPUT jack.
26. Set the generator frequency for approximately 150 Hz and the level for 707.0 ±5.0 millivolts RMS.
27. Place the MULTIPLIER switch to X10, and place MODE/UNITS to AA.
28. Place the IN LINE/CAL switch to CAL (momentary for each reading).
29. Observe an indication of 10.0 ±0.3 g's on the front panel meter.
30. Place the MULTIPLIER switch to X1 and set Fullscale Switch to 100.
31. Observe an indication of 100.0 ±3.0 g's on the front panel meter.
32. Place the MULTIPLIER switch to X0.1, FULLSCALE switch to 500.
33. Observe an indication of 1000 ±30 g's on the front panel meter.
34. Set the SENSITIVITY thumb switch to 0.100 and the FULLSCALE UNITS switch to 500, MULTIPLIER TO X1.
35. Observe an indication of 1000 ±30 g's on the front panel meter.
36. For testing CAL in other MODE positions see Input Sensitivity, in the Specifications section of Chapter 1, for proper readings.

This page was left intentionally blank.

Chapter 4
Calibration Test

The 203PC-1 Charge Amplifier is a plug-in module with the circuitry on a single, printed circuit board. Too calibrate, remove the module and use the Module Power Cord Assembly TT-1535 to apply power and Printed Circuit Connector Board Assembly TT-3408 to provide an interface for monitoring. For adjustment location, refer to **Figure 4-1**.

Test Equipment

Note: Equivalent test equipment can be substituted.

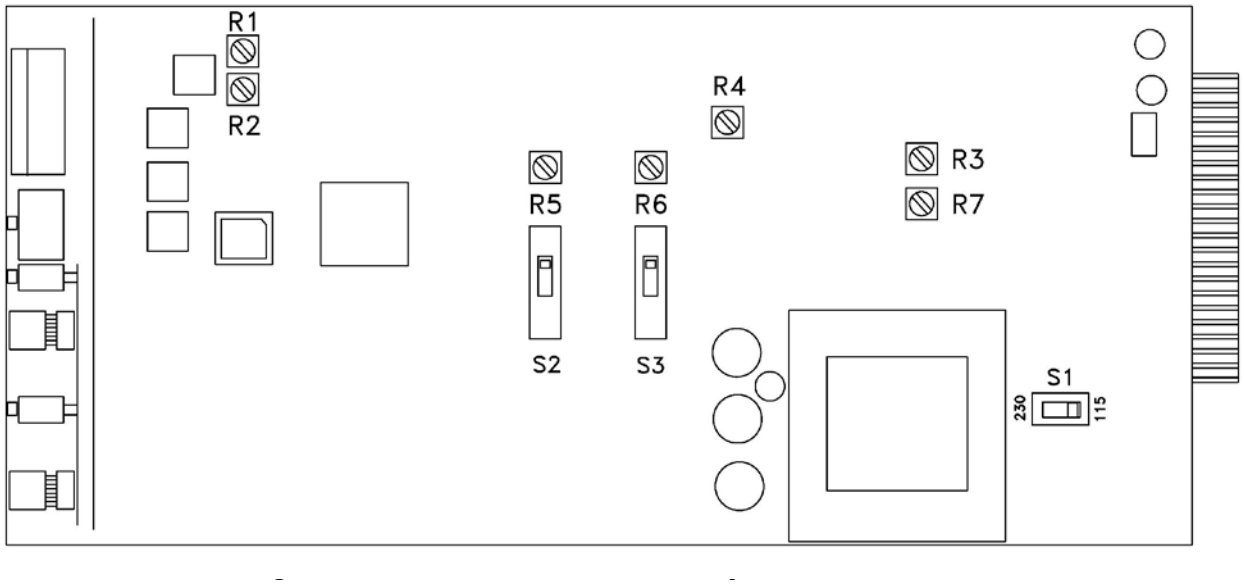
AC or DC Voltmeter	Keithley 191
Function Generator	Trig-Tek 346B Calibrator
Power Cord Assembly	TT-1535 Assembly
Printed Circuit Connector	TT-3408 Board Assembly

Place the module to be tested on the bench and plug the Printed Circuit Connector Board Assembly TT-3408 to the printed board connector at the rear of the module and the Power Cord Assembly TT-1535 to the power receptacle. Connect to 115 VAC power.

Switch Settings

Front Panel

Place the SE-ISO-DIFF switch to SE, the MODE switch to pC/g AA, the IN LINE (Blue) Filter switch OFF center position, the FULL SCALE UNITS switch to 100, the DC OUTPUT switch to X1, the HIGH PASS FILTER switch to 010 Hz, and the LOW PASS FILTER switch to 19.9 kHz. Place the MULTIPLIER to Xl0, the SENSITIVITY Thumb Switch to 100.0.



Internal

- HIGH PASS and LOW PASS Filters (S2 and S3) should be in same position as during NORMAL Operation.
- HP filter set to 20 Hz and LP filter set to 19.9 kHz.
- S4 (DC Output Selector NOR/FS) to NOR.

Charge Converter Adiustment

1. Connect the AC Voltmeter to Pin 8 of P1 (ACCEL OUTPUT of the connector board assembly.)
2. Connect a 100 ±5 Hz signal with a level of 7.07 ±0.05 Volts RMS to the ACCEL INPUT connector.
3. Set the ACCEL ADJ R3 for a 1.000 ±0.005 Volts indication on the AC Voltmeter.

Meter and Output Units Scaling

1. Short the ACCEL INPUT BNC.
2. Connect the DC Voltmeter to Pin 13 of P1 (DC OUTPUT of the connector board assembly).
3. Set the zero ADJ R4 for a 0 ±5 millivolts indication on the DC Voltmeter.
4. Connect the 7.07 ±.03 Volts RMS signal at 100 Hz to Pin 17 of P1 (ACCEL

INPUT of the Connector Board Assembly).

5. Set the DC FS ADJ R8 for a 1.000 ±0.004 Volts indication on the DC Voltmeter.
6. Set the METER ADJ (through the hole on DVM board) for a 100.0 ±0.5 g's indication on the front panel DVM.
7. Place the FULL SCALE UNITS switch (on the 203PC-1 front panel) to 200. Set Sensitivity Switch to X1. Set the generator output to 1.414 ±.03 Volts RMS.
8. Set the 2/20 ADJ R2 for an indication of 200 ±1 g's on the front panel.
9. Place the FULL SCALE UNITS switch switch to 500. Set Input Voltage to 3.54 ±.03 Volts RMS.
10. Set the 5/50 ADJ R1 for an indication of 500 ±1 g's on the front panel meter.
11. Connect the AC Voltmeter to Pin 10 of P1 (VEL OUTPUT) of the Connector Board Assembly and change the generator frequency to 61.4 and level to 3.54 V RMS.
12. Place the MODE switch (on the 203PC-1 front panel) to AV (pC/g) and the FULL SCALE switch to 50 IPS.
13. Set the VEL FS ADJ R5 for a 5.00 ±0.03 Volts indication on the AC Voltmeter (the front panel should read 50.0 ±1 IPS).
14. Place the MODE switch to AD, pC/g.
15. Set the generator for a 98.9 ±0.2 Hz.
16. Connect the AC Voltmeter to the DISPL OUTPUT, Pin 11 of P1 (DISPL OUTPUT of the Connector Board Assembly).
17. Set the DISPL FS ADJ R6 for a 5.00 ±0.05 Volts indication on the AC Voltmeter and the front panel meter should read 50 ±1.5 MILS Pk-Pk.
18. Place the FULL SCALE UNITS switch to 10 g's and the MODE switch to AA.
19. Connect the generator to the CALIB INPUT, Pin 5 of PI.
20. Set the generator frequency for approximately 150 Hz and the level for 707.0 ±5.0 mVRMS.
21. Depress the CAL switch to CAL.
22. Set CAL ADJ R7 for a 10.00 ±0.05 g's indication on the front panel meter.

This page was left intentionally blank.